POKROVSKIY, V.S.; SHCHADILOV, Yu.M.

Effect of man's work on changes in the habitat and number of moose. Okhr.prir.i zapov.delo v SSSR no.7:57-65 '62.

(MIRA 16:4)

(Moose)

BREGER, A.Kh.; Prinimali uchastiye: KARPOV, V.L., kand.khim.nauk;
    BELYNSKIY, V.A.; OSIPOV, V.B., PROKUDIN, S.D.; TYURIKOV, G.S.,
    kand.khim.nauk; GOL'DIN, V.A.; RYABUKHIN, Yu.S.; KOROLEV, G.N.;
    AFONIN, V.P.; POKROVSKIY, V.S.; KULAKOV, S.I.; LEKAREV, P.V.;
    FEDOROVA, T.P.; KOROTKOVA, M.A.; KHARLAMOV, M.T.; NIKOLENKO, G.D.;
    LOPUKHIN, A.F.; YEVDOKUNIN, T.F.; KASATKIN, V.M.; RATOV, A.V.

Nuclear radiation sources for radiational-chemical studies.
Probl.fiz.khim. no.1:61-72 '58.   (MIRA 15:11)

1. Nauchno-issledovatel'skiy fiziko-khimicheskiy institut
im. Karpova.
            (Radiochemistry) (Radioisotopes)

NARZIKULOV, M.N., otv. red.; BORISOV, V.A., red.; OVCHINNIKOV,
        P.N., red.; POKROVSKIY, V.S., red.; SAPOZHNIKOV, G.N.,
        red.; SHAPOSHNIKOV, L.K., red.; VINOGRADSKAYA, S.N.,
        red.izd-va; GELLER, S.P., tekhn. red.

[Transactions of the All-Union Congress on the Conserva-
tion of Nature] Trudy Vsesoiuznogo soveshchaniia po okh-
rane prirody. 3d. Dushanbe, Komissiia po okhrane prirody
AN Tadzhik.SSR, 1961. 128 p.   (MIRA 17:3)

1. Vsesoyuznoye soveshchaniye po okhrane prirody. 3d,
Dushanbe, 1960.

POKROVSKIY, V.S.

ROMANOVA, N.P.; POKROVSKIY, V.S.

Treatment of river beavers in the case of travassosiosis.
Trudy VNIO no.13:217-222 '53.   (MLRA 7:5)
        (Nematoda) (Parasites--Beavers)

POKROVSKIY, Viktor Sergeyevich; GUIEVICH, I.D., podpolkovnik, redaktor;
SOROKIN, V.V., tekhnicheskiy redaktor

[Take care of furs] Beregi pushninu. Moskva, Voen. izd-vo Ministerstva
obor. SSSR, 1956. 62 p.   (MIRA 9:11)
(Fur)

POKROVSKIY, V S.

AUTHOR: Shaposhnikov, L. K., Candidate of   SOV/30-58-9-47 /51
              Biological Sciences

TITLE: Protection of the Natural Resources of the Country (Okhrana
              prirodnykh bogatstv strany) All-Union Conference of the
              Committee for Nature Conservation. (Vsesoyuznoye soveshchaniye
              kommissiy po okhrane prirody)

PERIODICAL: Vestnik Akademii nauk SSSR, 1958, Nr 9, pp. 12o - 122 (USSR)

ABSTRACT: The coordination and supervision of this work is carried
              out by the Komissiya po okhrane prirody Akademii nauk SSSR
              (Committee for Nature Preservation of the AS USSR) as well as
              analogue committees of the Academies of Sciences of the
              Union's Republics and some branch institutions of the AS USSR.
              The first conference took place in Tbilisi from June 18
              to June 19. The following reports were heard and discussed:
              L.K.Shaposhnikov, Candidate of Biological Sciences spoke
              about the activity of the Committees for Nature Preservation
              and the tasks of nature preservation.
              V.Z.Gulisashvili, Member, Academy of Sciences, of the
              Georgian   SSR reported on the problems of nature preser-
Card 1/4   vation in the mountains.

Protection of the Natural Resources of the Country. All-   SOV/30-58-9-47/51
Union Conference of the Committee for Nature Conservation

V.S.Pokrovskiy, Candidate of Biological Sciences dealt
with the problem of protection of the fauna.
The Verkhovnyy Sovet Estonii (Supreme Soviet of Esthonia)
(in June 1957), and the Supreme Soviet of Armenia (in May
1958) passed bills for nature preservation which are in
force in the Republic. The Council of Ministers of the
Lithuanian SSR established a Committee for Nature Pre-
servation and the Council of Ministers of the Estonian
SSR an Administration for Nature Preservation.
In the Councils of Ministers of the Latvian and Ukrainian
SSR teams were formed who deal with the problem of nature
preservation. The TsK KP Ukrainy i Sovet Ministrov USSR (Central
Committee of the Communist Party of the Ukraine and the Council of
Ministers of the Ukr SSR) issued a joint decree concerning
measures for the improvement of nature preservation. The
Sovet Ministrov Azerbaydzhanskoy SSR (Council of Ministers
of the Azerbaydzhan   SSR) decided to organize a network
of National Parks on the territory of the Republic. In the
Card 2/4   years 1957 - 1958 the following number of National Parks

Protection of the Natural Resources of the Country. All-   SOV/3o-58-9-47/51
Union Conference of the Committee for Nature Conservation

was established: 8 in Georgia., 4 in Esthonia, 4 in Latvia,
4 in the RSFSR, 3 in Azerbaydzhan, 1 in Belorussia, and 1
in Kazakhstan. A series of measures for the future was de-
cided upon. Between 1959 and 1960 an Institut okhrany pri-
rody (Institute for Nature Preservation) is to be founded.
Problems of Nature Preservation are to be included in the
teaching programs of schools.

Card 3/4

POKROVSKIY, V.S.

Organization of the marking of mammals in the U.S.S.R. Migr.zhiv.
no.1:149-160 '59.   (MIRA 13:6)

1. Komissiya po okhrane prirody AN SSSR.
             (Animals, Marking of)

POKROVSKIY, V.S.; SHCHADILOV, Yu.M.

    State of the study of the migration of bats in the U.S.S.R.;
    based on the data of banding. Migr. zhiv. no.3:10-20 '62.
                                  (MIRA 16:2)
1. Komissiya po okhrane prirody pri Gosplane SSSR.
                  (Bats)
              (Animal migration)

POKROVSKIY, V.S.; SHCHADILOV, Yu.M.

Development of the marking of mammals in the U.S.S.R.
Migr. zhiv. no.3:5-9 '62.   (MIRA 16:2)

1. Komissiya po okhrane prirody pri Gosplane SSSR.
              (Mammals)
          (Animals, Marking of)

SOV/26-59-3-28/47

30(1)

AUTHOR: Pokrovskiy, V.S., Candidate of Biological Sciences (Moscow)

TITLE: The All-Union Conference of the Commissions for the Protec-
               tion of Nature

PERIODICAL: Priroda, 1959, Nr 3, p 113 (USSR)

ABSTRACT: In 1958, the first All-Union Conference of the Commissions
               for the Protection of Nature of the USSR Academy of Sci-
               ences and of the Union Republics, as well as of the Far
               East, Moldavian and Ural branches of the AS USSR took
               place in Tbilisi. Representatives of several other sci-
               entific institutions, departments and organizations of
               Azerbaydzhan, Latvia and the RSFSR participated in the
               work of the conference. They discussed the expediency of
               passing an All-Union law for the protection of nature, in
               particular for the preservation of the natural resources
               and individual objects, wild animals and plants, soils,
               water reservoirs, air and landscapes. The conference
               applied to the governments of the Union republics with
               the request to set apart reservations which play a great

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SOV/26-59-3-28/47

The All-Union Conference of the Commissions for the Protection of Nature

role in the protection of nature. It approved the proposi-
tion of the AS USSR and the USSR Gosplan to establish a
united state service for the protection of nature in place
of the specialized departmental inspections, also the or-
ganization of a Gosudarstvennyy komitet po okhrane prirody
Soveta Ministrov SSSR (State Committee on the Protection
of Nature attached to the USSR Council of Ministers) and
of appropriate committees with the Councils of Ministers
of the Union republics. It was considered extremely im-
portant to organize an all-round registration of changes
in the condition of the country's resources which arose in
consequence of man's activities. The conference backed a
proposal of the USSR Gosplan Commission to establish in
1959/60 an Institut okhrany prirody (Institute of Protec-
tion of Nature) with the USSR Academy of Sciences. The
conference works will be published in Tbilisi in 1959. It
is intended to conduct similar conferences every year. It
is planned to convene a second conference of the commissions
for the protection of nature in Vilnius in 1959.

Card 2/3

MAKOVSKIY, D.P.; POKROVSKIY, Vladimir Sergeyevich, otv.red.

[Developing commodity and monetary relations in agriculture of
the Russian state in the 16th century] Razvitie tovarno-denezh-
nykh otnoshenii v sel'skom khoziaistve russkogo gosudarstva
v XVI veke. Smolensk, Smolenskii pedagog.inst., 1960. 237 p.
(MIRA 14:4)

(Agriculture—Economic aspects)

ZHUKOVSKIY, L.I.;   MIKHNEV, A.L. professor, ispolnyayushchiy obyazonosti direk-
tor.

V.T. Pokrovskii, pupil and contemporary of S.P. Botkin; on the 75th anni-
versary of his death.   Terap.arkh. 25 no.2:71-76 Mr-Ap '53.   MLRA 6:5)

1. Otdel istorii meditsiny Ukrainskogo instituta klinicheskoy meditsiny
imeni akad. N.D. Strazhesko.   (Pokrovskii, Vasilii Timofeevich, 1838-
1878)

POKROVSKIY, V. V.

PA 70T41

USSR/Engineering   Apr 1948
    Pipe Lines
    Construction Equipment

"Pipe Layer on a Type S-80 Tractor," V. V. Pokrov-
skiy, Engr, GlavNefteGazStroy, 2½ pp

"Mekh Stroi" No 4

Presents details for the installation, diagrams of
the transmission, and method by which the pipe-laying
equipment operates.

70T41

POKROVSKIY, V. V., Eng.

Pumping Machinery

Pump for transporting BD-1 insulation materials. Mekh. stroi. 10, No. 3, 1953.

KOLESNIK, N.V.; IVANOV, A.P., kandidat tekhnicheskikh nauk, retsen-
zent; POKROVSKIY, V.V., kandidat tekhnicheskikh nauk, retsenzent;
DOKUCHAYEV, I.N., kandidat tekhnicheskikh nauk, redaktor.

[Static and dynamic balancing] Staticheskaia i dinamicheskaia
balansirovka. Moskva, Gos. nauchno-tekhn. izd-vo mashinostroit.
i sudostroit. lit-ry, 1954. 243 p.   (MLRA 7:8)
    (Balancing of machinery)

ZIL'BERMINTS, Lyudmila Veniaminovna; POKROVSKIY, V.V. redaktor.

[Machine vibration and ways of preventing it; a bibliography]
Vibratsiia mashin i mery bor'by s nei; bibliograficheskii uka-
zatel' (1945-1954) Leningrad, 1955. 149 p. (MLRA 8:8)

1. Leningrad. Publichnaya b'blioteka.
(Bibliography--Vibration)

POKROVSKIY, V.V. (st.Bolshovo Moskovskoy oblasti); RUTKEVICH, N.V.; LEVIN, I.R., (Tashkent); IVANOV, S.I. (Moskva); ROMANOV, P.A. (g.Zeya Amurskoy oblasti, shkola rabochey moledezhi).

Laboratory excercises in physics. Fiz. v shkole 16 no.4:63-66 Jl-Ag '56. (MLRA 9:9)

1.Stalinskaya shkola No.3 (for Pokrovskiy).2.Pervaya srednyaya shkola (for Rutkevich).

(Physics--Experiments)

AUTHOR: Pokrovskiy, V.V.

TITLE: Influence of components of tin slags on their viscosity and electrical conductivity. (O vliyanii komponentov olovyannykh shlakov na ikh vyazkost' i elektroprovodnost').

136-7-8/22

PERIODICAL: "Tsvetnyye Metally"
1957, No.7, pp.35-42 (USSR).

ABSTRACT: In tin smelting the viscosity of the slag influences metal losses, the case of slag tapping, convective heat exchange in the furnace and other factors; the electrical conductivity of the slag influences heat evolution in the bath. These properties of slags have been studied at the Heavy Non-Ferrous Metals laboratory of the Mintsvetmetzolota imeni M.I.Kalinina organization, this article being a report of this work carried out under the direction of Prof. Vanyukov. In some experiments the viscosity and conductivity determinations synthetic slags with the following composition ranges were used: $40.8 - 27.5\%$ SiO_2, $35.8 - 23.8\%$ CaO, $17.4 - 11.7\%$ Al_2O_3, $37.0 - 6.0\%$ Fe, $10.3 - 0\%$ SnO_2. In further work three industrial electric-smelting and one reverberatory-smelting slags were used

CARD
1/2

Influence of components of tin slags on their viscosity
and electrical conductivity. (Cont.)

136-7-8/22

both as obtained and with additions of $Ca F_2$, Na_2O or Mno.
The results are shown as viscosity and conductivity iso-
therms (1150 - 1400 C) for various percentages of the
respective components and, for the industrial slags, graphs
of viscosity and conductivity against temperature are
given together with curves of viscosity against % CaF_2 and
% Na_2O in the slag at various temperatures.

Although the compositions of synthetic slags used were
fixed on the basis of a statistical investigation of those
of industrial slags it is suggested that before practical
application verification of the recommendations made in
this paper should be carried out. Of the additions only
CaF_2 and Na_2O were found to affect viscosity appreciably,
and the choice between these two should be made on econo-
mic considerations.

There are 2 tables, 11 figures and 5 references, all Slavic.

AVAILABLE: Library of Congress

2/2

GAL'PERIN, Abram Isayevich, kand. tekhn. nauk; KRAYZEL'MAN, S.M.,
   retsenzent; POKROVSKIY, V.V., retsenzent; NOVIKOVA, M.K.,
   ved. red.

[Construction and assembly machines and mechanisms for
building gas and petroleum pipelines] Montazhno-
stroitel'nye mashiny i mekhanizmy dlia sooruzheniia ma-
gistral'nykh gazonefteprovodov. Moskva, Nedra, 1964. 356 p.
                                        (MIRA 17:6)
1. Glavnyy inzhener Upravleniya mekhanizatsii rabot Gosu-
darstvennogo proizvodstvennogo komiteta po gazovoy pro-
myshlennosti SSSR (for Krayzel'man). 2. Glavnyy konstruk-
tor Spetsial'nogo konstruktorskogo byuro "Gazstroymashina"
(for Pokrovskiy).

AUTHORS: Pokrovskiy, V.V., Vanyukov, V.A.

TITLE: On the Properties of Tin-smelting Slags (K voprosu o svoyst-
           vakh shlakov olovyannoy plavki)

ABSTRACT: The influence of SiO_2, CaO, FeO, SnO, CaF_2, Na_2O, and
             MnO on the viscosity η and the specific electric conductivity
             ν of tin-smelting slags was studied simultaneously on an ap-
             paratus consisting of a rotation viscosimeter and a resistance
             bridge in a nitrogen atmosphere. Crucibles and spindles of
             Armco-Fe were used for tin-free slags and Ni ones for slags
             containing tin. CaO in the 24-36% range decreases η, espec-
             ially at temperatures $<1350^{\circ}$C but increases ν slightly,
             which fact is explained by the destruction of $Si_xO_y^{2-}$-anions by
             the action of Ca^{2+}. Additions of FeO of up to 25% decrease η,
             while greater additions increase it, which is explained by the
             formation of large FeO_2^- anions in the melt. A decrease of
             SiO_2 content from 40 to 35% sharply decreases η; a further

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On the Properties of Tin-smelting Slags

decrease of SiO_2 leads to a considerable increase of ν, which is not desirable in electric-furnace slags. The optimum $SiO_2:CaO$ ratio is found to be 1:1 with their total content ~ 70%. CaF_2 and Na_2O are sufficiently active liquifyers at < 1300° temperatures when added to the slag in an ~3% amount. The effect of MnO on η and of CaF_2, Na_2O, and MnO on ν is very weak.

1. Tin--Production   2. Slags--Properties   3. Slags--Testing equipment
4. Metal oxides--Chemical effects   5. Calcium fluoride--Chemical effects

N.V.

Card 2/2

POKROVSKIY, V.V.

Influence of the components of tin slags on their viscosity and
electric conductivity. TSvet. met. 30 no.7:35-42 Jl '57.(MLRA 10:9)
                    (Tin--Metallurgy)   (Slag)

POKROVSKIY, V. V., Cand Tech Sci -- (diss) "Properties of slags of tin

smelting." Mos, 1958. 9 pp (Min of Higher Education USSR, Mos Inst

of Ferrous Xx Metallurgy xxxxxxxx and Gold im M. I. Kalinin), 110 copies

(KL, 17-58, 109)

POKROVSKIY, V. V.

"Stands for Vibration and Impact Tests,"

(Dynamics and Strength of Machines; Collection of Articles) Moscow, Mashgiz, 1958. (Series: Its: Leningrad Polytech Inst. Trudy, No. 192) 234 p.

SOV/137-58-9-18463D

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 9, p40(USSR)

AUTHOR: Pokrovskiy, V. V.

TITLE: Properties of Tin Smelting Slags (Svoystva shlakov olovyannoy plavki)

ABSTRACT: Bibliographic entry on the author's dissertation for the degree of Candidate of Technical Sciences, presented to the Mosk. in-t tsvetn. met. i zolota (Moscow Institute for Nonferrous Metals and Gold), Moscow, 1958

ASSOCIATION: Mosk. in-t tsvetn. met. i zolota (Moscow Institute for Nonferrous Metals and Gold), Moscow

1. Slags--Properties   2. Tin

Card 1/1

8(0)

AUTHOR: Pokrovskiy, V. V.

TITLE: Stands for Vibration and Shock Tests

ABSTRACT: Schemes, construction, and characteristics of stands are described, as well as schemes interesting for further development of stands. The vibration stands are: (1) Stands for calibrating the vibration primary detectors and for continuously testing the instruments (amplitude up to 2 mm, frequency 15-75 cps, acceleration up to 15 g; two figures in the text). A high accuracy of amplitude setting is an advantage of the above two stands. The second stand permits adjusting amplitude during operation. (2) A stand with a link-rod mechanism (amplitude 15 mm, frequency up to 40 cps, acceleration up to 60 g). Its distinctive features are: a wide range of frequency adjustment and a sinusoidal movement. (3) A stand with an equal-link crankshaft-rod

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Stands for Vibration and Shock Tests

SOV/112-59-4-7393

mechanism (acceleration up to 100 g, frequency up to 5 cps). (4) A stand with a mechanism of relative link rotation (acceleration within 0.1-50 g, frequency up to 10 cps). Stands for torsional oscillations (frequency 8-400 cps, amplitude 10° at 8 cps, 3' at 400 cps). An electrodynamic method is chiefly used for inducing high-frequency mechanical oscillations. The oscillation frequency can be adjusted. Shock-test stands operate on the principle of free oscillations of an elastic system upon a torsion of its shaft. The oscillation frequency can be changed; acceleration up to 500 g.

L.S.K.

Card 2/2

24.7100

78107
SOV/70-5-1-16/30

AUTHORS: Stepanova, V. M., Pokrovskiy, V. V., Regel', V. P.

TITLE: Concerning the Exposure of Dislocations in Rolled
Platelets of Silver Chloride

PERIODICAL: Kristallografiya, 1960, Vol 5, Nr 1, pp 108-114 (USSR)

ABSTRACT: Various methods and agents for etching silver halides,
suggested by numerous authors, are cited and those
suggested by D. A. Jones and J. W. Mitchell are
adopted. The single crystals of AgCl were reduced by
rolling till their thickness was 1/4 of the original
or less; annealed at 200° C or higher for 10 min to
2 hr; etched for a few seconds; washed in water,
examined under microscope, and the Laue diffraction
patterns taken with molybdenum radiation and camera
URS-70. The procedure provided $\pm$ 0.5° accuracy in the
determination of grain orientations. No etch pits
appeared prior to annealing. The grain boundaries,
exposed by etching, revealed the increase of the grain

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Concerning the Exposure of Dislocations   78107
in Rolled Platelets of Silver Chloride   SOV/70-5-1-16/30

size with the duration of annealing. The etch pits
on grain surfaces trend parallel to (001), less
frequently parallel to (110), and never parallel to
(111)   The first two are believed to represent the
planes of edge and screw dislocations, respectively.
As suggested by M. P. Shaskol'skaya and Yu. Kh.
Vekilov (Kristallografiya, 2, 4, 542-548, 1957), the
density of etch pits along the rows, confined to the
boundaries between disoriented blocks, is used for
determination of the degree of disorientation. It is
suggested that the orientation of a grain is defined by
α, an angle between the normal to the grain surface
and the cone axis of etch pits; this axis is parallel
to (100). The value of α can be determined by com-
paring the form of the etch pits on a given photograph
with those on a set of standard photographs with known
α. The experiments disclosed that the compression of
AgCl produces glide planes parallel to (100), and the
grains themselves become oriented with (100) parallel

Card 2/3   to the plate. Hence, no etch pits appear before this

Concerning the Exposure of Dislocations   78107
in Rolled Platelets of Silver Chloride   SOV/70-5-1-16/30

orientation is altered, due to a recrystallization
by annealing. Three types of glide planes, of which
the first cut through grain boundaries straight-
linearly, the second become genicular, and the third
stop at the boundary, are believed to result because
of the difference in orientation of the grains
involved. N. V. Sukhonosov is acknowledged for assistance.
There are 7 figures; and 7 references, 4 Soviet, 2 U.K.,
1 U.S. The U.S. and U.K. references are: J. W. Mitchell,
Dislocation in Crystals of Silver Halides, Dislocations
and Mechanical Properties of Crystal, New York, pp 69-92,
1956; D. A. Jones, J. W. Mitchell, The Etching of
Dislocation in Crystals of Silver Halides, Phil. Mag.
2, 20, 1047-1050, 1957; J. F. Nye, Proc. Roy. Soc. A,
198, 190-204, 1949.

ASSOCIATION: Crystallographical Institute of the Academy of Sciences,
               USSR (Institut kristallografii AN SSSR)

SUBMITTED: May 15, 1959
Card 3/3

POKROVSKIY, V.V., inzh.

New machines for constructing pipelines. Stroi.truboprov. 5
no.11:27 N '60.   (MIRA 13:11)
                    (Pipelines)

POKROVSKIY, V.V., inzh.

Helping the excavator operator ("Rotor trenching excavators
for laying pipelines" by P.Ia. Davidovich and others. Reviewed
by V.V. Pokrovskii).   Stroi. truboprovod. 6 no.8:32-3 of cover
Ag '61.   (MIRA 14:8)
            (Excavating machinery) (Davidovich, P.Ia.)
            (Zinovkina, M.M.) (Krikun, M.Ia.) (Luchshev, A.M.)

32662
S/126/61/012/005/026/028
E040/E435

18.8306

AUTHORS: Edel'man, F.L., Pokrovskiy, V.V., Tushinskiy, L.I.,
            Dautova, A.I.

TITLE: Superstructure and anomalous corrosion resistance

PERIODICAL: Fizika metallov i metallovedeniye, v.12, no.5, 1961,
            778-779

TEXT: The anomalous drop in the corrosion resistance of ferro-
aluminium alloys in the temperature interval of 550 to 580°C was
investigated on cast ferroaluminium specimens containing 2.49 to
29.36% Al and impurities of C, Si, Mn, S and P in the total
quantity of less than 0.5 to 0.8%.   The specimens were dissolved
in molten O-1 grade tin at various temperatures (up to 1200°C)
and the quantity of the dissolved ferroaluminium alloys was
determined at the various test temperatures.   All specimens were
annealed before tests.   The data obtained are shown graphically.
It was found that a sharp deterioration in the corrosion
resistance of ferroaluminium alloys corresponds to the
temperature intervals of 500 to 600°C and 1000 to 1200°C.   The
absolute solubility of the test specimens with various aluminium
contents is of the same order for all alloys with the exception of
Card 1/3

Superstructure and anomalous ...

those containing 16.11% Al and 25.76% Al.   Alloy steels 1Х13
(1Kh13), 1Х18Н9 (1Kh18N9) and 1Х18Н9Т (1Kh18N9T), titanium and
nickel tested under identical conditions had a lower corrosion
resistance than the ferroaluminium alloys.   Nickel was found to
dissolve completely in tin at 550°C.   An attempt is made to
interpret the test data in terms of the previously reported
concept of superstructure (Ref.1: Bradley A.I. et al. J. Iron and
Steel Institute, v.125, 1932, 339; Ref.2: Sykes C. et al. J. Iron
and Steel Inst., v.131, 1935, 225; Ref.3: Bradley A.I. et al.
J. Iron and Steel Inst., v.141, 1940, 63) which affects the
corrosion resistance properties of ferroaluminium alloys in the
temperature interval of the order-disorder transformation (550 to
580°C) and arises in consequence of the disappearance of domain
structure of ordered alloys and the development of lattice defects
and their diffusion in crystals.   The most probable cause of the
observed reduction in the corrosion resistance of the alloys is the
appearance of lattice defects at the instant when disorder sets in,
which leads to a weakening of the interatomic bond forces.   There
are 1 figure and 6 references: 3 Soviet-bloc and 3 non-Soviet-bloc.
The three references to English language publications are quoted in
Card 2/3

32662
S/126/61/012/005/026/028
Superstructure and anomalous ...   E040/E435

the text.

ASSOCIATION: Novosibirskiy elektrotekhnicheskiy institut
             (Novosibirsk Electrotechnical Institute)

SUBMITTED: March 13, 1961

Card 3/3

35920
S/148/62/000/002/007/008
E073/E535

AUTHORS: Edel'man, F.L., Pokrovskiy, V.V., Tushinskiy, L.I.
             and Dautova, A.I.

TITLE: Stability of alloy steels in molten tin

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Chernaya
             metallurgiya, no.2, 1962, 123-124

TEXT: The aim of the work was to determine the stability
of various metals and alloys in molten tin at temperatures above
500°C. Specimens made of alloy steels of standard composition,
of pure metals (titanium, tantalum and nickel) and of iron-
aluminium alloys containing 2.49, 16.11, 18.44, 21.62, 25.76 and
29.36% aluminium, rest Fe were immersed for two hours in molten
tin at temperatures between 400 and 1250°C.   The degree of
dissolution of the metal in the tin was determined by calculation
from the difference between the initial and the final contents of
the particular material in the tin. Titanium and tantalum proved
resistant against dissolution in tin but became brittle at 600°C
and above; therefore, they are unsuitable as structural materials
under the given conditions. At temperatures up to 1000°C, the
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36937

S/136/62/000/004/002/004
E193/E383

/8·31 0 0

AUTHORS: Moshkina, V.A., Pokrovskiy, V.V. and Repkin, D.I.

TITLE: Remelting tin-plant dusts as means of increasing the
            indium concentration

PERIODICAL: Tsvetnyye metally, no. 4, 1962, 61 - 63

TEXT: The normal procedure in pyrometallurgical extraction
of tin is to recirculate dusts from electrostatic filters, as a
result of which the indium content in this by-product increases,
reaching a value which can vary from several hundredths to
several tenths of a %. A reducing roasting method of extracting
indium from the product, developed by A.S. Sinakevich and
M.Ya. Chernyavskoy and based on different reduction potentials
and sublimation pressures of tin, zinc and indium oxides,
appeared most promising when used on a laboratory scale but did
not give satisfactory results under industrial conditions.
Frequently, partial fusion of the charge occurred, as a result of
which only a small portion of indium was recovered in the gaseous
phase. This was due to too high a tin content in the dust and
wide variation of the concentration of other components from one
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Remelting tin-plant dusts ....

S/156/62/000/004/002/004
E193/E383

batch of tests to another.- hence the attempt described in the present paper to reduce the tin content in the dusts, to increase their indium content and to ensure a more consistent concentration of other components by remelting the primary dusts in an electrical furnace and producing secondary dusts to be treated by the process described above. The experimental material (primary dusts) contained 0.137% In, 38.7% Sn 9.9% soluble and 28.8% insoluble in HCl), 2.17% Pb and traces of metallic Cd and silicon, calcium, aluminium and iron oxides. Coal and coke fines were used as the reducing agents, calcium oxide with a lime content of 75.54% being used as the flux. Each charge consisted of 81% primary dust, 6% coal, 3% coke fines and 3% lime. After mixing, moisture was introduced into the charge which was then converted to granules 5 - 20 mm in size and remelted in an electric furnace at 450 - 500 °C. Typical results are given in Tables 1 and 2. It will be seen that as a result of this treatment, the Zn and In contents of the starting material were increased 2.4 and 2.8 times, respectively; the Sn content being decreased by a factor of 2.3.

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Remelting tin-plant dusts ....

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No fusion of the charge occurred when the product obtained
by remelting was subjected to reducing roasting, and 90 - 95%
recovery of indium was attained.
There are 1 figure and 2 tables.

Key to Table 1 :   1 - Products of remelting;   2 - Sn, soluble
in HCl;   3 - Sn, insoluble in HCl;   4 - Secondary dust;
5 - Scrubber slime;   6 - metal;   7 - Slag;   8 - Difficultly
meltable residue.

Table 1:   Composition of the products of remelting primary dusts

① Продукты плавки	In	Sn	Sn ② раство- римое в HCl	Sn ③ нераст- воримое в HCl	Zn	Pb	As	Cd	CaO	Fe₃O₄	SiO₂
④ Вторичная пыль	0,388	16,8	11,33	5,47	39,95	0,96	1,3	0,45	—	—	—
⑤ Шлам скруббера	0,24	20,71	12,05	8,66	47,88	0,92	1,08	—	—	—	—
⑥ Металл	0,152	90,4	—	—	0,39	2,4	3,96	—	—	—	—
⑦ Шлак	0,0061	1,3	—	—	1,79	0,14	Нет	—	17,9	7,11	34,22
⑧ Гартлинг . . .		24,03	—	—	7,5	1,03	0,98	—	—	—	—

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Remelting tin-plant dusts S/136/62/000/004/002/004
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Table 2:   Distribution of components in the products of
melting, %

Key: 1 - Products of remelting;   2 - Secondary dust;
3 - Scrubber slime;   4 - Metal;   5 - Slag;   6 - Difficultly
meltable residue;   7 - Total;   8 - Losses.

(1) Продукты плавки	In	Sn	Pb	As
(2) Вторичная пыль	48,6	7,5	11,6	10,2
(3) Шламы скруббера	9,3	1,3	1,6	1,2
(4) Металл	40,6	86,3	62,0	65,9
(5) Шлак	1,2	1,1	3,2	—
(6) Гартлинг	4,5	2,55	3,0	1,8
(7) Итого	99,2	98,75	81,4	79,1
(8) Потери	0,8	1,25	18,6	20,9

Card 4/4

POKROVSKIY, V.V.; SAMODELOV, A.P.; SUTURIN, S.N.

    Trends and prospects for developments in the tin smelting process.
    TSvet. met. 38 no.9:41-42 S '65.

                                     (MIRA 18:12)

PILYUKOVA, A.T.; POKROVSKIY, V.V.; SAMODELOV, A.P.

Solubility of indium hexamminocobaltichloride in hydrochloric
acid solutions at 25°C. Zhur. neorg. khim. 10 no.7:1748-
1749 Jl '65.   (MIRA 18:8)

POKROVSKIY, V.V.

Indium distribution in the products of tin ore dressing and
smelting conversion in tin plants. Tsvet. met. 38 no.8:89-
90 Ag '65.   (MIRA 18:9)

POKROVSKIY, V.V.; SAMODELOV, A.P.; SKROBOTYKATOV, A.A.

Electrochemical refining of crude zinc in fused salts. Tsvet. met. 38 no.2:86 F '65.

L 59555-65   EWT(m)/EWP(t)/EWP(b)   IJP(c)   JD

ACCESSION NR: AR5012847   UR/0137/65/000/003/G043/G043

SOURCE: Ref. zh. Metallurgiya, Abs. 3G266

AUTHOR: Pokrovskiy, V. V.; Arzamastsev, Yu. S.; Purvinskiy, O. F.

TITLE: Production of pure intermetallic compounds of tin and iron

CITED SOURCE: Uch. zap. Tsentr. n.-i. in-t olovyan. prom-sti, no. 2, 1964, 44-45

TOPIC TAGS: intermetallic compound, tin compound, iron compound, gartling, tin plating, plating, electrolysis, electrolyte, sulfuric acid

TRANSLATION: An electrolytic method was adopted for production of $FeSn_2$. Starting material was the so-called "gartling" which is a waste product of the hot tin plating of iron sheets; it consists of crystals of $FeSn_2$ cemented with tin. Its chemical composition is 84.92% tin, 15.05% iron, and 0.03% other materials. A bar of "gartling" served as the anode, and an iron sheet as the cathode. $D_k = 600$ a/m^2, D_a is a variable quantity which increases continually. The electro-

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L 59555-65

ACCESSION NR: AR5012847

lyte was a solution of sulfuric acid (70 grams/ liter) with additions of joiner's glue (1 gram/liter) and beta naphthol (1 gram/liter). Crystalline $FeSn_2$ fell out on the bottom of the bath, not mixing with the cathode residue. The intermetallic compound obtained was a dark gray crystalline powder. Its tin content was 78. 6%. X-ray and chemical analyses confirmed that a sufficiently pure preparation can be obtained by the electrolytic method (97. 1 of the basic substance, $FeSn_2$). G. Svodtseva

SUB CODE: MM   **ENCL: 00**

Card 2/2

POKROVSKIY, V.V.; SUTURIN, S.N.; SAMODELOV, A.P.

Trends and prospects for developments in the tin refining process.
TSvet. met. 38 no.2:41-43 F '65.   (MIRA 18:3)

POKROVSKIY, V.V.

Machines for work in the winter. Stroi. truboprov. 8 no.9:4
S '63.   (MIRA 16:11)

1. Spetsial'noye konstruktorskoye byuro "Gazstroymashina".

POKROVSKIY, V.V.

Basic environmental factors determining the abundance of the
whitefish Coregonus albula L.: Trudy sov. Ikht. kom. no.13:
228-234 '61.   (MIRA 14:8)

1. Gosudarstvennyy nauchno-issledovatel'skiy institut
ozernogo i rechnogo rybnogo khozyaystva - GosNIORKh.
            (Russia, Northwestern—Whitefishes)

POKROVSKIY, V. V.

Riapushka ozer Karelo-Finskoi SSR. /Whitefish (Goregonus albula L.) of the lakes of the Karelo-Finnish S.S.R_/. Petrozavodsk, Gosizdat Karelo-Finskoi SSR, 1953. 107 p

SO: Monthly List of Russian Accessions, Vol 6 No 8 November 1953

ALAMPIYEV, P.M.; VITYAZEVA, V.A.; LISTENGURT, F.M.; MAKSAKOVSKIY, V.P.;
    POKSHISHEVSKIY, V.V., prof.; SOLOV'YEVA, M.G., dotsent;
    LYALIKOV, N.I., dotsent, red.; ZAK, A.L., tekhn.red.

[Economic geography; toponymy. Collected articles] Ekonomicheskaia
geografiia: Toponimika; sbornik statei. Moskva, 1960. 169 p.
                                                    (MIRA 14:2)
1. Moscow. Moskovskiy gosudarstvennyy pedagogicheskiy institut.
Geografo-biologicheskiy fakul'tet.
            (Geography, Economic)
        (Europe, Eastern--Names, Geographical)

ALEKSANDROV, B.M., nauchnyy sotrudnik; ALEKSANDROVA, T.N., nauchnyy
sotrudnik; BELYAYEVA, K.I., nauchnyy sotrudnik; GORBUNOVA, Z.A.,
nauchnyy sotrudnik; GORDEYEVA-PERTSEVA, L.I., nauchnyy sotrudnik;
GORDEYEVA, L.N., nauchnyy sotrudnik; GULYAYEVA, A.M., nauchnyy
sotrudnik; DMITRENKO, Yu.S., nauchnyy sotrudnik; ZABOLOTSKIY, A.A.,
nauchnyy sotrudnik; MAKAROVA, Ye.F., nauchnyy sotrudnik; NOVIKOV,
P.I., nauchnyy sotrudnik; POKROVSKIY, V.V., nauchnyy sotrudnik;
SMIRNOV, A.F., nauchnyy sotrudnik; STEFANOVSKAYA, A.F., nauchnyy
sotrudnik; URBAN, V.V., nauchnyy sotrudnik. Prinimali uchastiye:
BALAGUROVA, M.V., nauchnyy sotrudnik; VEBER, D.G., nauchnyy sotrudnik;
POTAPOVA, O.I., nauchnyy sotrudnik; SOKOLOVA, V.A., nauchnyy sotrudnik;
FILIMONOVA, Z.I., nauchnyy sotrudnik; POPENKO, L.K., nauchnyy sotrudnik;
ZYTSAR', N.A., red.; PRAVDIN, I.F., red.; PANKRASHOV, A.P., red.;
SHEVCHENKO, L.V., tekhn.red.

[Lakes of Karelia; natural features, fishes, and fisheries] Ozera
Karelii; priroda, ryby i rybnoe khoziaistvo; spravochnik. Petroza-
vodsk, Gos.izd-vo Karel'skoi ASSR, 1959. 618 p.   (MIRA 13:8)
(Continued on next card)

ALEKSANDROV, B.M. --- (continued) Card 2.
1. Russia (1917- R.S.F.S.R.) Karel'skiy ekonomicheskiy admi-
nistrativnyy rayon. Sovet narodnogo khozyaystva. . 2. Karel'skoye
otdeleniye Vsesoyuznogo nauchno-issledovatel'skogo instituta ozernogo
i rechnogo rybnogo khozyaystva (for Aleksandrov, Aleksandrova, Be-
lyayeva, Gorbunova, Gordeyeva-Pertseva, Gordeyeva, Gulyayeva, Dmitrenko,
Zabolotskiy, Makarova, Novikov, Pokrovskiy, Smirnov, Stefanovskaya,
Urban). 3. Karel'skiy filial AN SSSR (for Balagurova, Veber, Potapova,
Sokolova, Filimonova, Popenko).
(Karelia--Lakes)

BORODINA, T.R.; POKROVSKIY, V.Ye._

Chemical weed control from the airplane. Zashch. rast. ot vred.
i bol. 6 no.5:34-35 My '61.   (MIRA 15:6)

1. Gosudarstvennyy nauchno-issledovatel'skiy institut
Grazhdanskogo vozdushnogo flota.
                         (Weed control)

ACCESSION NR: AP4043354   S/0181/64/006/008/2358/2360

AUTHORS: Godik, E. E.; Pokrovskiy, Ya. Ye.

TITLE: Coefficients of capture of holes by atoms of indium and boron in silicon

SOURCE: Fizika tverdogo tela, v. 6, no. 8, 1964, 2358-2360

TOPIC TAGS: group III element, capture cross section, impurity conductivity, silicon photocell, phonon, cascade

ABSTRACT: The only published paper on this subject (J. S. Blakemore, Canad. J. Phys., v. 34, 938, 1956) is devoted to the capture of holes by negatively charged indium atoms in silicon. Boron is used additionally in the present investigation because it is the shallowest "hydrogen-like" acceptor in silicon (the corresponding energy level is $\Delta E = 0.046$ eV above the valence band). The silicon was doped with indium and boron by a crucible-less zone crystallization

Card   1/3

ACCESSION NR: AP4043354

procedure described elsewhere (Ya. Ye. Prokovskiy and K. I. Svis-
tunova, FTT, v. 3, 757, 1961). Antimony was used to compensate
for the strenuous shallow acceptors in the indium-doped silicon.
The test procedure and equipment are described. The values ob-
tained for the capture coefficients for holes in singly negatively
charged indium and boron atoms in silicon are $\sim 2 \times 10^{-6}$ and $\sim 10^{-4}$
$cm^3 \ sec^{-1}$ for indium at 78K and for boron at 20K, respectively.
Although these values are quite large, they agree in order of mag-
nitude with those obtained by the theory of cascade phonon capture
for low temperatures in the presence of Coulomb attraction (M. Lax,
Phys. Rev. v. 119, 1502, 1960). "The authors thank Professor S. G.
Kalashnikov for continuous interest in the work and for a discussion
of the results, and V. V. Proklov for help with the measurements."
Orig. art. has: 6 formulas and 1 table.

ASSOCIATION: Institut radiotekhniki i elektroniki AN SSSR, Moscow
(Institute of Radio Engineering and Electronics, AN SSSR).

Card 2/3

A 53

SA

537.583

7045.   The mechanism of thermionic emission of an oxide cathode in impulse conditions.   Ya. R. Pokrovskii,   J. Exp. Theo r. Phys., USSR, 21, 423-8 (March, 1951) In Russian.

Author assumes the following mechanism: Before the extraneous field is applied, there is dynamic equilibrium between the electrons of the cloud of the space charge, those of the conductivity zone and the electrons of the localization levels, respectively. If the external field is strong enough, all the electrons arriving from the zone of conductivity in the vacuum are carried by the field to the anode. The equilibrium will be upset because the electrons from the oxide penetrate into the bacuum without returning (the cloud of the space charge being dissipated by the external field), the concentration in the conductivity zone thus falling and only partly being replenished by electrons acceding from the core.. The reduction of the concentration goes on until the influx from the core establishes a new equilibrium, the latter then determining the emission set up. This may be theoretically based on semiconductor conceptions. The confirmation of this theory is obtained by a quantitatively correct formula for the fatigue of

(OVER)

METALLURGICAL LITERATURE CLASSIFICATION

POKROVSKIY, YA. YE.

USSR/Physics - Semiconductivity   May 52

"Effect of Surface on Type of Electric Conductivity of Semiconductor," S. G. Kalashnikov, Ya. Ye. Pokrovskiy, Res Inst of Phys, Moscow State U

"Zhur Tekh Fiz" Vol XXII, No 5, pp 883, 884

Describes results of measuring thermoelectromotive force in various samples of electron semiconductors. In the case of fine-pressed powder, the electron cond changed into hole cond. These tests clarify results obtained by Granwelle and Hosarth (cf. Proc Phys Soc, 64 B, 488, 1951) who observed change of

sign of cond during polishing of surface of lead sulfide and germanium. Letter to the editor, received 6 Feb 52.

222T90

222T90

4754.   Remarks on the paper by K. B. Tolpygo $621.385.032.216 : 537.583$ "Mechanism of the falling-off of thermionic emission of an oxide cathode operating in impulse conditions." YA. E. POKROVSKII. *Zh. eksper. teor. Fiz.*, 24, No. 4, 486-7 (1953) *In Russian.*

See preceding abstract. Tolpygo's criticism is refuted, as based partly on an approximate solution of a system of equations, and partly on an inexact equation found in the author's previous paper [*Zh. eksper. teor. Fiz.*, 21, 423 (1951)], which is now corrected.

·F. LACHMAN (R)

POKROVSKIY, Ya. Ye.

Dissertation: "Influence of Surface Levels on the Electrical Properties of Germanium, Silicon, and Tellurium." Cand Phys-Math Sci, Moscow Order of Lenin State U imeni M. V. Lomonosov, 28 Apr 54. (Vechernyaya Moskva,--Moscow, April 54)

SO: SUM 243, 19 Oct 1954

USSR/Physics - Electric properties of Ge, Si, Te

Card 1/1   Pub 153-9/26   FD-900

Author   : Pokrovskiy, Ya. Ye.

Title   : Effect of surface levels on electric properties of fine-grained
                films of germanium, silicon and tellurium

Periodical   : Zhur. tekh. fiz. 24, 1229-1243, Jul 1954

Abstract   : Electric properties of films, because of the large ratio of sur-
                face to volume, depend on type of surface levels and on grain
                size. Surface levels of Ge are acceptors and their Hall constant
                depends on grain size. Resistance of Si films rises with in-
                creasing grain size and this is explained by the presence of a
                vacant and filled surface zone at short distance from each other
                in the middle of the forbidden band. Te has surface acceptor
                levels located directly over the filled zone. Indebted to
                Prof. S. G. Kalashnikov. Twenty two references including 17
                foreign.

Institution : --

Submitted   : December 15, 1953

AUTHOR: Kleshchevnikova, S.I., Pokrovskiy, Ya.Ye.   57-8-1/36
              Rumyantseva, Ye.I.

TITLE: Preparation of Pure Si by the Thermal Decomposition of
              Silane (Polucheniye chistogo kremniya termicheskim razlozheniyem
              silana)

PERIODICAL: Zhurnal Tekhn. Fiz., 1957, Vol. 27, Nr 8, pp. 1645-1648 (USSR)

ABSTRACT: The method as well as the apparatus are described. Monosilane
              was produced by means of the disproportionation of triethoxi-
              silane in presence of metallic sodium and was subjected to thermal
              decomposition after a simplest kind of purification. The decomp-
              sition was carried out on a tantalum band which was heated with
              current to 950°. The bark of polycrystalline Si forming on this
              occasion can be separated from tantalum in form of a bar. The bar
              can be used for a zonal recrystallization. The monocrystals ob-
              tained after a zonal melting of the Si bars without crucibles
              have a specific electric resistance of up to 50 Ohm per cm and a
              life of the electrons not in equilibrium of up to 300 μsec.
              There are 2 figures and 2 Slavic references.

ASSOCIATION: Moscow State University im. M.V.Lomonosov   (Moskovskiy gosudarst-
              vennyy universitet imeni M.V.Lomonosova)

AVAILABLE: Library of Congress
Card 1/1

SOV-120-58-1-38/43

AUTHORS: Pokrovskiy, Ya. Ye. and Dik, V. B.

TITLE: An Apparatus for Zone Crystallization of Silicon without the Use of a Furnace (Ustanovka dlya bestigel'noy zonnoy kristallizatsii kremniya)

ABSTRACT: Because of the high chemical activity of molten silicon it is difficult to obtain pure monocrystals of silicon if one uses a furnace. In order to circumvent this fact a method was developed whereby such crystals may be obtained without the use of a furnace (Ref.1). As is well known, the method consists in producing a narrow band of molten silicon on a vertical crystalline specimen and then moving it along the rod. After several such traversals the specimen becomes quite pure and a monocrystal appears. The present paper is concerned with a method for producing such a molten zone on a silicon specimen. The rod is heated inductively and the apparatus for doing this is substantially similar to that described by Soled and McDonald (Ref.2) except that it is assembled from components manufactured and available in the Soviet Union. Monocrystals of silicon were obtained without the use

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An Apparatus for Zone Crystallization of Silicon without the Use of a Furnace.

SOV-120-58-1-38/43

of a monocrystal primer and with the inductor moving at a rate of approximately 1 - 6 mm/min. The length of the mono- crystals obtained was 100-120 mm, the diameter being 5-7 mm. The specific resistance of the monocrystals reached 130 ohm.cm and the lifetime of non-equilibrium electrons 300 μ sec. S. G. Kalashnikov is thanked for his interest in this work. There is 1 figure and 5 references, 1 of which is German and 4 English.

ASSOCIATION: Fizicheskiy fakul'tet MGU (MGU Department of Physics)

SUBMITTED: January 26, 1957.

1. Single crystals--Growth   2. Silicon crystals--Preparation
3. Silicon--Processing

Card 2/2

AUTHORS: Givargizov, Ye. I., Pokrovskiy, Ya. Ye.   57-28-5-9/36

TITLE: Influence of Thermal Treatment on the Electric Properties of
               Silicon (Vliyaniye termoobrabotki na elektricheskiye svoyst-
               va kremniya)

PERIODICAL: Zhurnal Tekhnicheskoy Fiziki, 1958, Vol. 28, Nr 5, pp. 974-
               -976 (USSR)

ABSTRACT: In the present paper the authors investigated the influence
               of a thermal treatment on the concentration of the current
               carriers and their life in monocrystals of hole-type silicon,
               which originated from the thermal decomposition of monosilane,
               with a subsequent zonal recrystallization. The thermal treat-
               ment consisted of a heating of the monocrystalline silicon
               samples in vacuum and a hardening in vaseline oil. The volume-
               tric life τ in the samples was determined by photoelectric
               methods according to the formula $\tau = L^2/D$. No adhesion was found
               in the initial material or in the thermally treated samples.
               The specific resistance was measured by means of a compensat-
               ion method with a high-resistance potentiometer. The figure
               shows the dependence of the recombination probability $\frac{1}{\tau} - \frac{1}{\tau_0}$

Card 1/3   on the hardening temperature T in two samples. In this case

Influence of Thermal Treatment on the Electric Properties of   57-28-5-9/36
Silicon

a correction of the life in the initial material τ_0 , amount-
ing to about 3oo microseconds was made in both samples; As
can be seen from the figure, the life decreases with the har-
dening temperature to a few microseconds at 45o$^\circ$C.The specific
resistance remains unchanged, at least at temperatures below
60ooC. It can be assumed from the experiments, that the re-
duced life is mainly due to the diffusion of the impurities
from heated parts of the apparatus. The reduction of the life
by |———| annealing can be traced back to the deposition of the
impurities. The character of the dependence of the life on the
hardening temperature is identical in both samples. It can be
assumed, that the equilibrium concentration of the introduced
recombination centers is the same in both samples. The diff-
erence between the curves can be explained by the dependence
of the life on the hole concentration in silicon. As was
mentioned earlier, no modifications of specific resistance
were observed in thermal treatment. The obtained results
essentially differ from the paper mentioned in Ref 3. This is
only natural as in the paper mentioned in Ref 3 special mea-
sures were taken to clean the heated parts of the apparatus.
For this reason the introduction of recombination centers

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Influence of Thermal Treatment on the Electric Properties of 57-28-5-9/36
Silicon

because of the impurity diffusion was little probable. From
this it follows, that in the thermal treatment of silicon
monocrystals the processes of the proper thermal treatment
may be camouflaged by impurity diffusion. The heating of the
crystals is in particular inadmissible in equipment possess-
ing heated quartz parts. The author thanks S. K. Kalashnikov
for his interest shown in this work. There are 1 figure and
1o references, 2 of which are Soviet.

ASSOCIATION: Fizicheskiy fakul'tet Moskovskogo gosudarstvennogo universit-
eta (Physics Department of Moscow State University)

SUBMITTED: January 27, 1958

1. Silicon crystals--Electrical properties   2. Silicon crystals
--Temperature factors

Card 3/3

POKROVSKIY, Ya.Ye.; KLESHCHEVNIKOVA, S.I.; RUMYANTSEVA, Ye.I.

Some improvements in the production of pure silicon by the thermal
decomposition of silane. Fiz. tver. tela 1 no.6:999-1001 Je '59.
(MIRA 12:10)

1.Moskovskiy gosudarstvennyy universitet, Fizicheskiy fakul'tet.
(Silicon) (Silane)

POKROVSKIY, Ya. Ye. and SVISTUNOVA, K. I.

"On recombination in Silicon doped by indium, potassium, and antimony."

report to be submitted for the Intl. Conference on Photoconductivity, IUPAP,
Cornell University, Ithaca, N.Y., 21-24 Aug 1961.
(Kalashnikov, S. G. is scheduled to present the paper)

9.4300 (1150, 1143, 1136)

26.2421

20786
S/181/61/003/003/011/030
B102/B205

AUTHORS: Pokrovskiy, Ya. Ye. and Svistunova, K. I.

TITLE: Study of recombination in silicon alloyed with gallium, indium, and antimony

PERIODICAL: Fizika tverdogo tela, v. 3, no. 3, 1961, 757-767

TEXT: The electron-hole recombination in semiconductors has been studied several times, but the effect of various impurities on this process has not been duly considered. Of particular interest is the effect of the elements of the third and the fifth group on the lifetime of carriers in silicon, since these elements were used to obtain silicon of a given conductivity. A study has now been made of the effect of Ga, In, and Sb on the recombination of minority carriers in silicon. The starting material were single crystals of silicon, which had been obtained by zone crystallization. They had a resistivity of some hundred ohm·cm; the carrier lifetime varied from 200 to 800 μsec. The specimens were cut along the growth axis (111), and had a size of $15 \cdot 4 \cdot 3$ mm^3. Minute quantities of impurities were added. The distribution coefficients for Ga, Sb, and In amounted to 0.01, 0.04, and

Card 1/4

20786

Study of ...

S/181/61/003/003/011/030
B102/B205

5.10^{-4}, respectively. The carrier concentration was determined from the Hall effect in direct current. The ratio of the Hall mobility to the drift mobility was 1.18 for n-type and 0.71 for p-type crystals. The carrier lifetime was determined from the vanishing of photoconductivity. Within the region of partial ionization of the acceptors, the hole concentration, p_0, is given by $\dfrac{p_0(N_D+p_0)}{N_A-N_D-p_0} = N_v e^{-E/kT}$, where N_A is the acceptor concentration, N_D the donor concentration, and N_v the effective state density in the valence band; E is the acceptor ionization energy. If $N_D \ll N_A$, p_0, $p_0 = \sqrt{N_A N_v}\, e^{-E/2kT}$. For In one obtains $E = 0.16$ ev; the activation energy for almost all specimens was equal to $E/2 = 0.08$ ev. This indicates that $N_D \ll N_A$, p_0 for all specimens. In the following, the authors report on a comparison of various specimens concerning the dependence of the minority carrier lifetime τ on the majority carrier concentration, and the temperature dependence of τ [Abstracter's note: The specimens studied are indicated by numbers and letters; their composition and parameters, however, are not given]. Specimens containing gallium in concentrations of more than $10^{16} cm^{-3}$ had similar

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carrier lifetimes varying from 9 to 11 μsec. The recombination rate of these specimens was determined, not by Ga, but by unchecked impurities or defects. In-doped specimens showed the same hole concentration but some-what shorter lifetimes. The electron trapping cross section for In was not larger than 10^{-19} cm^2. At temperatures below $200^\circ K$, all In- and Ga-doped crystals had a carrier lifetime of about 5 μsec, irrespective of their impurity concentration. With a further rise in temperature, many In-doped specimens showed an exponential increase of lifetime; in this range, τ was proportional to $1/p_o$. The hole capture cross section for In was found to be of the order of 10^{-15} cm^2. A study of the dependence of τ on the electron concentration in Sb-doped specimens showed that if the concentration of Sb is changed by two orders of magnitude, τ remains practically unchanged. This is taken as an indication that Sb does not affect the recombination rate in Si. τ is determined by deep unchecked recombination centers. In- or Sb-doped specimens had a lifetime of 10-12 μsec, which was largely independ-ent of the concentration of In. A study of the temperature dependence of the time in which the photoconductivity in n-type In-doped specimens van-ishes has shown a number of peculiarities. While Sb-doped specimens exhibit

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a. slow decrease of lifetime with dropping temperature, In-doped specimens show an exponential increase of τ. The activation energy of this process was 0.16 ev. These observations may be described by the relation $\tau = \tau_{p_0} (1 + N_t/p_1^t)$, where p_1^t is the hole concentration in the case where the Fermi level coincides with the indium level; N_t is the concentration of indium. The most important results of these studies are the following: 1) Ga and Sb do not affect the recombination rate in Si; the carrier lifetime in Si alloyed with these elements is determined by the existence of unchecked recombination centers. 2) The electron trapping cross section for In atoms is less than 10^{-19} cm^2, and the hole trapping cross section for In atoms is larger than 10^{-18} cm^2. 3) n-type Si alloyed with In and Sb displays adhesion effects. This may be quantitatively explained by the trapping of holes by ionized In atoms. Professor S. G. Kalashnikov is thanked for discussions and his interest in the work. There are 5 figures, 2 tables, and 12 references: 4 Soviet-bloc and 8 non-Soviet-bloc.

Inst. Radio Engineering & Electronics AS USSR

Card 4/5

24.7700 (1055, 1137, 1043)

28097
S/181/61/003/009/031/039
B108/B138

AUTHORS: Pokrovskiy, Ya. Ye., and Svistunova, K. I.

TITLE: Radiative capture of electrons by indium atoms in silicon

PERIODICAL: Fizika tverdogo tela, v. 3, no. 9, 1961, 2820-2826

TEXT: The authors measured the electrons radiative capture cross section of neutral indium atoms in indium-silicon alloys at low temperatures. They used a metallic cryostat, consisting of a double Dewar flash with observation windows. The equilibrium concentration n_0 of electrons was determined from the d.-c. Hall effect, and it was found to decrease with temperature from about 10^{16} cm^{-3} at 300°K to about 10^{14} cm^{-3} at 50°K. The relaxation time τ was determined from the decrease of photoconductivity in the case of a slight deviation from equilibrium. With falling temperature, τ rises exponentially to about 85°K and remains practically constant from that point on. The authors have shown before (Ref. 1: FTT, III, 757, 1961) that the constant relaxation time is determined by the expression

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$$\tau = \frac{1}{S_n^o v n_o}$$, where v denotes the mean thermal velocity of the electrons and

S_n^o the conduction-electron capture cross section. The S_n^o of indium atoms was calculated from this formula and plotted against temperature in Fig. 3. In order to explain the nature of the elementary processes determining S_n^o, the authors undertook a quantitative examination of the recombination radiation at 80^oK using polished 1 mm plates as specimens. An $C\phi$-4 (SF-4) spectrophotometer was used for electron-hole pair generation. The sharp intensity peak as determined with the aid of an 0.03 ev resolving monochromator of the type YM-2 (UM-2) was found to be at 0.97 ev. The calculated value was 1.01 ev (Refs. 4,5: J. A. Burton. Physica, 20, 845, 1954; F. J. Morin, J. P. Maita. Phys. Rev., 96, 29, 1954). Fundamental calculations indicated that not more than 70% of the total recombination radiation could pass the surface of the samples. Substituting

$h\nu = 0.97$ ev $= 1.6 \cdot 10^{-19}$ watt.sec, one can calculate the intensity of re-

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combination radiation from the formula

$$I_r = 0.7 \cdot 1.6 \cdot 10^{-19} \frac{n_0 V}{\tau S} \left(\frac{R_0}{R} - 1 \right) \text{ watt.cm}^{-2},$$

where V denotes the volume of the sample, S the surface area of the sample, R_0 the dark resistance, and R the resistance at the respective illuminations. The specimen 26 Б with an indium concentration of $4.5 \cdot 10^{15}$ cm^{-3} gave a measured recombination radiation intensity which was 88% of the calculated one. For the specimen 27 Б which had an indium concentration of $6 \cdot 10^{16}$ cm^{-3} the calculated and measured values were the same, that is, practically all capture events are followed by photon emission. The conduction-electron capture cross section of neutral indium atoms is silicon is determined by the radiative transitions. Professor S. G. Kalashnikov and V. L. Bonch-Bruyevich are hanked for discussions and advice. There are 5 figures, 1 table, and 6 references: 1 Soviet and 5 non-Soviet. The two most recent references to English-language publications read as follows: J. R. Haynes, W. C. Westphal. Phys. Rev., 101, 1676, 1956; M. Lax, Phys. Rev., 119, 1502, 1960.

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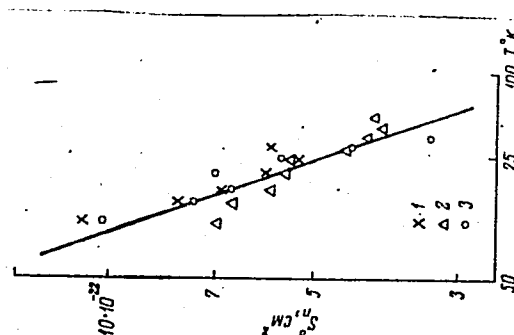Radiative capture of electrons ...   28097   S/181/61/003/009/031/039
B108/B138

ASSOCIATION: Institut radiotekhniki i elektroniki AN SSSR Moskva
(Institute of Radio Engineering and Electronics of the AS USSR
Moscow)

SUBMITTED: May 18, 1961

Fig. 3

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L 15553-63   EWP(q)/EWT(m)/BDS   AFFTC/ASD   JD
ACCESSION NR: AP3003883

AUTHORS: Pokrovskiy, Ya. Ye.; Svistunova, K. I.

S/0181/63/005/007/1880/1886

TITLE: Some peculiarities of radiative electron capture at indium and gallium atoms in silicon

SOURCE: Fizika tverdogo tela, v. 5, no. 7, 1963, 1880-1886

TOPIC TAGS: capture, radiative capture, electron, In, Ga, Si, phonon, atom, indium, gallium, silicon

ABSTRACT: It has been found that the coefficient of electron capture at neutral atoms of In and Ga in Si is near 10^{-12} cm^3 sec^{-1} at 30K and that it increases exponentially on decrease in temperature, with an activation energy of about 0.035 ev. It has been established that the coefficient of electron capture at Ga atoms, as at In atoms, is determined by radiative transitions. An investigation of the spectral distribution of recombination radiation has shown that electron capture at Ga atoms occurs with an emission of phonons, whereas at In a considerable part of the capture process occurs without the accompaniment of phonons. The setup for measuring recombination radiation is shown in Enclosure 1. "In conclusion the authors express their thanks to Professor S. G. Kalashnikov for discussions of the results." Orig. art. has: 4 figures, 1 table, and 3 formulas.

Card 1/3/   ASSOCIATION: Institute of Radio Engineering and Electronics,
                                        Academy of Sciences, SSSR

L 24793-65   EWT(m)/EWP(b)/EWP(t)   IJP(c)   JD/JG
ACCESSION NR: AP5003471   S/0181/65/007/001/0326/0327

AUTHORS: Proklov, V. V.; Godik, E. E.; Pokrovskiy, Ya. Ye.

TITLE: Generation-recombination noise in silicon doped with boron
and indium

SOURCE: Fizika tverdogo tela, v. 7, no. 1, 1965, 326-327

TOPIC TAGS: noise, silicon, doping, generation recombination noise,
carrier lifetime, capture coefficient

ABSTRACT: The authors investigated noise in boron-doped silicon,
at a temperature of approximately 20K, and in indium-doped silicon
at ~78K. The use of special current contacts has made it possible
to reduce appreciably the level of the $1/f$ current noise. The in-
vestigation was made in the frequency range 30 kcs--30 Mcs. The
analyzer and intermediate-frequency voltage amplifier was an all-
wave receiver. The signal was detected with a TVB-4 thermal con-

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ACCESSION NR: AP5003471   O

verter, so that the noise power was measured directly. Special
measures were adopted to reduce the input capacitance to ~3 pF. The
use of low-noise tubes and suitable operating tube conditions made
it possible to reduce the equivalent noise resistance of the measur-
ing system to 400--500 ohms in the indicated frequency band. The
measuring system was calibrated against the thermal noise of the
load and sample resistances. At low temperatures, the current noise
was found to agree with the theoretical values derived from the
theory of generation-recombination noise (A. Van der Ziel, Fluctua-
tion phenomena in semiconductors, London, Butterworths, 1959). The
values obtained for the lifetime from the noise factor in the region
of the noise plateau and from the decrease in noise at high frequen-
cy were 2×10^{-8} and 3×10^{-8} sec, respectively, and their approxi-
mate equality confirms the generation-recombination theory. In the
case of indium-doped silicon, only the plateau of the generation-
recombination noise could be observed and there was no noticeable
decrease in the noise level at high frequency. The lifetime of the

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ACCESSION NR: AP5003471   2

holes, determined from the noise in the plateau region, turned out
to be 2.0 x 10^9 sec, which suggests a value of ~100 Mc for the region
where the noise decreased. The values obtained for the coefficient
of hole capture by the negatively charged boron atoms at 20K in
silicon were 7 x 10^{-5} cm^3/sec, and for indium at 78K the value was
1.5 x 10^{-6} cm^3/sec. This agrees with values obtained in investiga-
tions of stationary impurity photoconductivity. "The authors thank
Professor S. G. Kalashnikov for continuous interest and a discussion
of the work." Orig. art. has: 1 figure and 1 formula.

ASSOCIATION: Institut radiotekhniki i elektroniki AN SSSR, Moscow
(Institute of Radio Engineering and Electronics AN SSSR)

SUBMITTED: 27Jun64   ENCL: 00   SUB CODE: SS

NR REF SOV: 002   OTHER: 002

Card   3/3

L 04054-67   EWT(m)/EWP(t)/ETI   IJP(c)   JD

ACC NR: AP6026677   SOURCE CODE: UR/0181/66/008/008/2326/2329

AUTHOR: Chikovani, R. I.; Pokrovskiy, Ya. Ye.

ORG: Institute of Radio Engineering and Electronics, AN SSSR, Moscow (Institut radiotekhniki i elektroniki AN SSSR)

TITLE: Determination of the photoionization cross section of negatively charged indium atoms in silicon

SOURCE: Fizika tverdogo tela, v. 8, no. 8, 1966, 2326-2329

TOPIC TAGS: photoionization, indium containing alloy, silicon base alloy, crystal impurity, atom property, negative charge

ABSTRACT: Photoionization cross section of negatively charged indium atoms in silicon was determined by the method of comparing the intrinsic photoconductivity with the impurity photoconductivity. This method is especially simple in the case of quasi-monopolar photoconductivity when the value of the intrinsic and impurity photoconductivities is determined by the same life-time of the majority carriers. The value of the intrinsic photoconductivity in this case is written in the form

$$\delta V_1 = \frac{i_1 \tau}{q \mu n_0^2} I_1 (1 - R), \qquad (1)$$

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ACC NR: AP6026677

since in the intrinsic region all radiation entering the crystal is observed as the result of the generation of electron-hole pairs. With impurity excitation the photoconductivity has the form

$$\delta V_2 = \frac{i_2 \tau}{q \mu n_0^2} I_2 \frac{(1-R)(1-e^{-kd})}{1-Re^{-kd}}. \tag{2}$$

where I_1 and I_2 are the intensities of the incident radiation with intrinsic (1) and impurity (2) excitation; i_1 and i_2 are the currents to the specimen; R is the reflection coefficient, τ is the lifetime of the electrons; μ is their mobility; n_0 is the equilibrium concentration; $k = \sigma N$ is the absorption coefficient caused by impurities in concentration N; σ is the photoionization cross section; d is the thickness of the specimen; and q is the electron charge. The expression for determining σ ultimately takes the form

$$\frac{\sigma Nd}{1-R} = \frac{i_1 i_2'}{i_2 i_1'}. \tag{3}$$

where i_1, i_2, i_1', and i_2' are currents through the silicon and germanium in intrinsic and impurity photoconductivity, respectively. It is shown that the cross section is small and has a

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L 04054-67

ACC NR: AP6026677

magnitude of the order of 10^{-18} cm^2. The coefficient of radiative capture of an electron by a neutral indium atom proved to be equal to about 10^{-14} cm$^3 \cdot$ sec^{-1}, which satisfactorily agrees with the value obtained on the basis of investigating the kinetics of photoconductivity. The authors thank S. G. Kalashnikov for his constant interest in the work and discussion of the results. Orig. art. has: 3 figures and 4 formulas.

SUB CODE: 20/   SUBM DATE: 25Dec65/   ORIG REF: 002/   OTH REF: 002

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Card 3/3

L 33421-66 EWT(1) IJP(c) AT

ACC NR: AP6013526   SOURCE CODE: UR/0120/66/000/002/0194/0195

AUTHOR: Pokrovskiy, Ya. Ye.; Godik, E.E.

ORG: Institute of Radio Engineering and Electronics, AN SSSR, Moscow (Institut radiotekhniki i elektroniki AN SSSR)

TITLE: Apparatus for the investigation of stationary photoconductivity at low temperatures

SOURCE: Pribory i tekhnika eksperimenta, no.2, 1966, 194-195

TOPIC TAGS: photoconductivity, stationary photoconductivity, IR photoconductor black body radiation, liquid helium, laboratory optic instrument

ABSTRACT: Apparatus for the determination of photoconductivity is described. It extends the range of precise measurements to low temperatures and into the IR beyond 10 microns. This is achieved by placing both the black body radiator (200-250°K) and the liquid He cooled sample in a liquid N cooled evacuated enclosure. Sensitivity is enhanced by time modulation of the radiation source with a cold (100°K) perforated rotating disk. Apparatus was used for stationary photoconductivity study of B-doped Si. Authors thank S.G. Kalashnikov for his interest and attention to this work. Orig. art. has 1 figure.

SUB CODE: 17, 20/   SUBM DATE: 25Mar65/ .   ORIG REF: 001

UDC: 621.59:535.215.12

Card 1/1 ULR

L 9672-66   EWT(1)

ACC NR: AP5027451   SOURCE CODE: UR/0181/65/007/011/3464/3465

AUTHOR: Pokrovskiy, Ya. Ye.; Svistunova, K. I.

ORG: Institute of Radio Engineering and Electronics AN SSSR, Moscow (Institut radiotekhniki i elektroniki AN SSSR)

TITLE: Effect of doping on the recombination radiation of diodes with an n-GaSb base region

SOURCE: Fizika tverdogo tela, v. 7, no. 11, 1965, 3464-3465

TOPIC TAGS: gallium compound, antimonide, tellurium, semiconductor diode, recombination radiation, radiation spectrum

ABSTRACT: The authors study recombination radiation spectra of GaSb diodes as a function of tellurium concentration in the base region. The p-type emitter regions of the specimens were zinc-doped to a concentration of $\sim 1 \cdot 10^{20}$ cm^{-3}. The Hall constant at room temperature was used for determining the tellurium content in the n-type base region. Current-voltage curves are given as well as curves for the spectral distribution of recombination radiation. Diodes with a Hall constant of -76 show a typical rectifying current-voltage curve, while the curve for diodes with a Hall coefficient of -14.5 is characteristic of tunnel type diodes. Diodes with intermediate concentrations of tellurium have rectifying characteristics, the reverse currents increas-

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ACC NR: AP5027451

ing with tellurium content. The recombination radiation spectra lie in an energy region which is narrower than the forbidden band in GaSb ($\sim$0.813 ev at 4.2°K). The energy corresponding to the peaks in the spectra increases with tellurium concentration at first, and then drops sharply. The peak shifts from $\sim$0.74 for a Hall coefficient of -20 to $\sim$0.70 for $R = -14.5$. The width of the spectra increases with concentration of tellurium, a second maximum appearing in the spectrum for GaSb with a Hall coefficient of -14.5. Thus both the transition from rectifying characteristics to tunnel characteristics and the sharp change in the nature of the spectra take place with an extremely small reduction in the negative Hall constant. A theoretical explanation is given for these phenomena. The authors are grateful to S. G. Kalashnikov for discussion of the results, and to V. G. Alakseyeva for furnishing the GaSb specimens. Orig. art. has: 2 figures.

SUB CODE: 20/   SUBM DATE: 22Jun65/   ORIG REF: 001/   OTH REF: 002

Card 2/2

PROKLOV, V.V.; GODIK, E.E.; POKROVSKIY, Ya.Ye.

Generation and recombination noises in silicon doped with boron and indium. Fiz. tver. tela 7 no.1:326-327 Ja '65.

(MIRA 18.3)

1. Institut radiotekhniki i elektroniki AN SSSR, Moskva.

POKROVSKIY, Ya.Ye.; SVISTUNOVA, K.I.

Impurity recombination radiation from indium-doped n-silicon. Fiz.
tver. tela 7 no.5:1579-1581 My '65.   (MIRA 18:5)

1. Institut radiotekhniki i elektroniki, Moskva.

L 54734-65 EWT(1)/EWP(e)/EWT(m)/EWP(1)/EWP(t)/EWP(b) IJP(c) JD/JG/GG
UR/0181/65/007/006/1837/1845

ACCESSION NR: AP5014589

AUTHOR: Pokrovskiy, Ya. Ye.; Svistunova, K. I.

TITLE: Impurity and inter-impurity radiative recombination in silicon

SOURCE: Fizika tverdogo tela, v. 7, no. 6, 1965, 1837-1845

TOPIC TAGS: radiative recombination, photoconductivity, silicon, conduction band,
radiative transition, electron capture

ABSTRACT: This is a continuation of earlier investigations by the authors (FTT v.
5, 1880, 1963 and v. 6, 19, 1964), dealing with attenuation of photoconductivity in
n-type silicon. To explain some of the earlier results, the authors investigated
the kinetics of photoconductivity and the spectral distribution of the impurity re-
combination radiation in n-type silicon containing indium or boron, with an aim at
ascertaining whether allowance for the direct electronic transitions between the
impurity atoms of the donors and acceptors is necessary. The silicon was strongly
doped to make the impurity band overlap the conduction band of the silicon, and to
make the electron density independent of the temperature. To provide a low injec-
tion level, the sample was illuminated through a silicon light filter at room tem-
perature, while the sample itself was kept in a cryostat at low temperature. The

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ACCESSION NR: AP5014589

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results show that at low temperatures, when the electron concentration (n) in the conduction band becomes lower than 10^{13} cm^{-3}, the recombination rate is determined by the direct radiative transitions between the donor and the acceptor atoms. The coefficient of inter-impurity radiative recombination was found to be close to 3 x $x 10^{-18}$ cm^3/sec and to depend little on the temperature. When $n > 10^{13}$ cm^{-3}, the recombination rate is determined by radiative capture of the electrons from the conduction band by the indium or boron atoms. It is thus shown that direct electronic transitions between the donor and acceptor atoms can play an important role and even determine the rate of recombination at low temperatures at relatively low injection levels. At high injection levels, however, which were used in the earlier investigations, capture of the free non-equilibria carriers by the neutral atoms of indium, gallium, boron, and bismuth in silicon predominate. "The authors thank S. G. Kalashnikov for a discussion of the work." Orig. art. has: 5 figures and 5 formulas. [02]

ASSOCIATION: Institut radiotekhniki i elektroniki AN SSSR, Moscow (Institute of Radio Engineering and Electronics, AN SSSR)

SUBMITTED: 21Jan65   ENCL: 00   SUB CODE: GC, NP
NO REF SOV: 005   OTHER: 002   ATD PRESS: 4030
Card 2/2

KARPOVA, I.V.; POKROVSKIY, Ya.Ye.

Radiative capture of current carriers by neutral indium and antimony atoms in germanium. Fiz. tver. tela 6 no.12:3631-3635 D '64   (MIRA 18:2)

1. Institut radiotekhniki i elektroniki AN SSSR, Moskva.

AUTHOR: Pokrovskiy, Ya. Ye.; Svistunova, K. I.

TITLE: Impurity recombination radiation of n-type silicon diodes doped with indium

SOURCE: Fizika tverdogo tela, v. 7, no. 5, 1965, 1579-1581

TOPIC TAGS: injection laser, junction laser, semiconductor laser, laser, stimulated emission, silicon laser, free carrier absorption, recombination radiation

ABSTRACT: An experimental investigation was made of impurity recombination of silicon p-n junction diodes. N-type Si monocrystals containing In ($p = 10^{17}$ cm^{-3}) were doped with Sb ($n = 2-3.5 \cdot 10^{18}$ cm^{-3}). Cylindrical diodes approximately 2.2 mm in diameter were fabricated with a p-n junction perpendicular to the polished surface of the cylinder. At a temperature of 22K, plots of the intensity of recombination radiation versus injection current were similar for all diodes. The intensity increased linearly until a current of 7 amp (current density of ∿ 18 amp/cm^2) was reached. At higher injection currents the intensity increased much more rapidly and reached a peak at about 1.6 amp. The energy of the peaks in recombination spectra corresponded to the energy of emission due to electronic transitions between the conduction band of the Si and In impurity levels. Considerable line

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ACCESSION NR: AP5012488

narrowing was observed in the experiments. At 1.5 amp the spectral width was about one-half that at 0.8 amp. These experimental data indicate that some of the recombination radiation is stimulated radiation. A population inversion of free electrons relative to unoccupied In levels is achieved as a result of trapping of injected holes by negatively charged In atoms in the basal region near the junction and as a result of the high concentration of free electrons in the basal region. However, calculations show that since the cross section for capture of electrons by In atoms in Si is relatively small ($\sim 10^{-14}$ cm$^3 \cdot$sec^{-1}) amplification will not exceed free carrier absorption. Therefore, it is concluded that laser action cannot be achieved in n-type Si doped with In. Orig. art. has: 2 figures.   [CS]

ASSOCIATION: Institut radiotekhniki i elektroniki, Moscow (Institute of Radio Engineering and Electronics)

SUBMITTED: 25Dec64   ENCL: 00   SUB CODE: EC

NO REF SOV: 002   OTHER: 005   ATD PRESS: 4002

Card 2/2

POKROVSKIY, Ya.Ye.; SVISTUNOVA, K.I.

Radiative capture of current carriers by impurity atoms in silicon and germanium. Fiz. tver. tela 6 no.1:19-24 Ja '64. (MIRA 17:2)

1. Institut radiotekhniki i elektroniki AN SSSR, Moskva.

S/0181/64/006/001/0019/0024

ACCESSION NR: AP4011731

AUTHORS: Pokrovskiy, Ya. Ye.; Svistunova, K. I.

TITLE: Radiative capture of current carriers at impurity atoms in silicon and germanium

SOURCE: Fizika tverdogo tela, v. 6, no. 1, 1964, 19-24

TOPIC TAGS: radiative capture, capture, current carrier, charge carrier, impurity atom, silicon, germanium, capture coefficient, electron, hole, boron, bismuth, zinc, radiative transition, recombination radiation, useful absorption, free electron

ABSTRACT: The authors have determined the temperature dependence of the capture coefficient of electrons at neutral atoms of boron and of holes at neutral atoms of bismu h in silicon, and also of electrons at singly charged negative atoms of zinc in germanium. These relations are shown in Fig. 1. on the Enclosure. The authors have found that the capture coefficient is determined by radiative transitions. In examining the connection between spectral distribution of impurity recombination radiation and deep impurity levels, they have shown that the contribution of radia- tive transitions, occurring without the participation of phonons, increases as the depth of level becomes greater. Because of the relative small capture coefficient,

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